SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 17.—"The Thermo-chemistry of the Alloys of Copper and Zinc," by T. J. Baker, King Edward's School, Birmingham. Communicated by Prof. Poynting, F.R.S.

The heats of formation of a number of alloys of copper and zinc have been ascertained by measuring the difference between the heats of dissolution, in suitable solvents, of each alloy and of an equal weight of a mere mixture containing the metals in the same proportion.

The following solvents were employed :—

(*a*) An aqueous solution of chlorine.

(*b*) A mixture of ammonium chloride and ferric chloride solutions.

(*c*) A mixture of ammonium chloride and cupric chloride solutions.

The first solvent did not give satisfactory results, although it showed that the heat of dissolution of an alloy was sensibly less than that of the corresponding mixture.

Solvents *b* and *c* were found to be very suitable; the chemical actions concerned are simple reductions, and no gases are evolved.

Two series of experiments made on twenty-one alloys yielded very concordant results.

A sharply defined maximum heat of formation is found in the alloy containing 32 per cent. of copper, *i.e.* corresponding to $CuZn_2$. It amounts to 52·5 calories per gramme of alloy, or 10,143 calories per gramme-molecule. There is some evidence of a sub-maximum in the alloy corresponding to CuZn.

From these points there is a steady decrease in the heat of formation, both in the case of alloys containing less than 32 per cent. of copper as the quantity of copper decreases, and also in the case of those containing more than 50 per cent. of copper as the amount of copper increases.

The results, in general, confirm the existence of intermetallic compounds, and the values obtained are in accordance with those demanded by Lord Kelvin's calculation of the molecular dimensions of copper and zinc.

Royal Microscopical Society, January 16.—Annual Meeting. William Carruthers, Esq., F.R.S., President, in the chair.—Mr. Hugh M. Leake exhibited a new form of rocking microtome, designed to cut perfectly flat sections. Dr. Hebb said it seemed to remedy the defects of the ordinary Cambridge rocker, it appeared to be easily manipulated and was very stable and solid in construction.—Dr. Hebb read the report of the council for the year 1900.—The president announced that the whole of the Fellows nominated for officers and council had been duly elected, and expressed his thanks to the Fellows of the Society for again placing him in the position which he had occupied during the past year. He congratulated the Society upon the improved conditions indicated in the report. He then read the annual address, which consisted chiefly of an epitome of the life and work of John Ellis, known in his time as "Coralline Ellis."

Mineralogical Society, January 22.—Prof. A. H. Church, F.R.S., President, in the chair.—Dr. C. O. Trechmann contributed a note on an occurrence of colourless, water-clear mirabilite in gypsum-rock from Kirkby Thore in Westmoreland.—Mr. Alfred Harker discussed a question relative to extinction-angles in rock-slices. A rhombic crystal gives straight extinction in any section parallel to a bisectrix. The author has investigated the degree of departure from straight extinction introduced by a slight obliquity in the direction of section, and finds that no serious error can result unless the angle between the optic axes (measured over the bisectrix in question) is a very large one.—Prof. Lewis communicated an additional note by Mr. R. W. H. T. Hudson on the rotation of points and planes about an axis. Mr. W. Barlow exhibited a model showing an arrangement for the chemical atoms of calcite, which gives the observed crystal-symmetry and is capable of artificial twinning. He explained that the indiarubber balls forming the model are intended to show spherical spheres of influence of the atoms, and that he had arrived at the relative magnitudes which should be used by a geometrical study of elementary stereochemical properties of the carbon compounds. Such models are not supposed to throw any light on the actual forms of the chemical atoms, but are consistent with the supposition that each of these is in motion about a geometrical centre, provided that the centre retain a definite relative situation with respect to the centres belonging to other surrounding atoms. In this, like the stereochemists, he lays stress on the space arrangement of the atoms within the molecule. Mr. H. B. Hartley exhibited a device to facilitate the separation of minerals by means of heavy liquids.

PARIS.

Academy of Sciences, January 28.—M. Fouqué in the chair.—The production of hydrogen in the igneous rocks, by M. Armand Gautier. In seeking for the cause of the development of free hydrogen from granitic rocks at a red heat, it was found that hydrogen is evolved when steam is passed over red-hot ferrous salts. The reaction with ferrous sulphide was carefully studied, and found to be in accordance with the equation $3FeS + 4H_2O = Fe_3O_4 + 3H_2S + H_2$. Various rocks, after a preliminary extraction of the occluded gases by heating in a vacuum, gave, on further heating in a current of steam, a mixture of hydrogen, methane and carbon-monoxide.—The expenditure of energy necessitated by motor work and resisting work in man when raising or lowering himself on Hirn's wheel. The evaluation from the oxygen absorbed in the respiratory exchanges, by M. A. Chauveau.—The permanent secretary announced to the Academy the loss it had sustained by the death of M. J. G. Agardh, correspondant in the Section of Botany.—Diverse positions of the neutral fibre in bodies broken by flexure; the cause of fragility, by M. Ch. Frémont. In discussing the experiments of Mr. Hadfield on the mechanical properties of the iron-nickel alloys, it is shown that these results are in accordance with the views previously put forward by the author.—On the propagation of the Hertzian waves in wireless telegraphy, by M. E. Lagrange. From some experiments described, in which the wire emitting the waves was entirely underground, it is concluded that the waves do not penetrate the interior of the earth, and that there is probably absorption and reflection of the waves emitted in the ordinary way.—A study of uranium nitrate, by M. Œchsner de Coninck.—Action of boron bromide upon the iodides of phosphorus and upon the halogen compounds of arsenic and antimony, by M. Tarible. The halogen compounds of phosphorus form double compounds with one or two molecules of boron bromide. The chlorides of arsenic and antimony give an ordinary double decomposition, the bromides and iodides, on the other hand, simply going into solution without any reaction taking place.—Action of œnanthylic alcohol upon its sodium derivative; a new method of synthesis for the alcohols, by M. Marcel Guerbet. As a result of the action of œnanthylic alcohol upon its sodium derivative there is produced œnanthylic acid, di-œnanthylic alcohol, triœnanthylic alcohol, and the corresponding acid.—Direct hydrogenation in presence of reduced nickel; the preparation of hexahydrobenzene, by MM. Paul Sabatier and J. B. Senderens (see p. 354).—On the mechanism of diastatic actions, by M. Hanriot. Further experiments are brought forward in support of the hypothesis that the action of lipase is a reversible one, and it is pointed out that this reversibility is not an isolated fact, a similar action having been already indicated by Hill in the reaction of maltose and glucose. These results modify the views now held as to the function of the internal ferments in the organism.—Researches on fibrinolysis, by M. L. Camus. Immunity can be produced by injecting into the vessels substances in suspension in a 0·8 per cent. solution of salt. Injections of fibrin do not determine the production of a fibrinolytic serum, and the normal serum may dissolve the precipitate caused by the serum of an immunised animal.—On the relations of the Gregarians and the intestinal epithelium, by M. Michel Siedlecki. *Monocystis ascidiae* passes the greatest portion of its period of growth altogether in a cell of the intestinal epithelium of a Tunicate, *Ciona intestinalis*, even in its earliest stages, the Gregarian has the characters of the adult animal, simply increasing in size as its grows.—Intracellular parasitism and the asexual multiplication of the Gregarians, by MM. Maurice Caullery and Félix Mesnil. It is shown that there is a great variety of relations between these parasites and the intestinal epithelium, there being all degrees of development from a growth entirely extracellular to a completely intracellular development. — On the inversion of the heart in one of the component subjects of a living double monster, by M. Chapot-Prévost. One of the subjects, who died shortly after the separating operation, had the heart normally placed. The other, who survived the operation, was shown by radiography to have the heart inverted. This case of cardiac heterotaxy entirely confirms the ideas of Dareste on the

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importance of this phenomenon in teratology.—Remarks by M. Lannelongue on the preceding paper.—On the manna of the olive, by M. Trabut. In the region of Bibans there is a considerable number of olive trees which exude during the summer a very large quantity of manna. On analysis this was found to be identical with the manna from the ash, containing about 52 per cent. of mannite.—Influence of the osmotic pressure of the medium on the form and the structure of vegetables, by M. J. Beauverie. The roots of *Phaseolus*, growing in a concentrated solution, possess no medulla, the differentiation of the ligneous tissue proceeding from the centre. There is also very early produced an abundant pericyclic cork layer, having evidently a protective function as regards the central cylinder. In a root of the same age growing in water there is, on the contrary, a voluminous medulla, and there is no premature production of cork.—On the presence of the genus *Caprina* in the Urgonian, by M. V. Paquier.—On the specific heats of silk, wool and cotton, by M. Testenoire. A reclamation of priority against M. G. Fleury.

GÖTTINGEN.

Royal Society of Sciences.—The *Nachrichten* (physico-mathematical section), part 3, for 1900, contains the following memoirs communicated to the Society:—

June 16.—O. Wallach: I. (1) On the splitting-up of cyclic oximes, (2) hexacyclic ketones, (3) heptacyclic ketones; II. New syntheses in the terpene series.

June 30.—A. Loewy: On the transformation into itself of a non-vanishing Hermite determinant.

July 14.—E. Riecke: On the relative conductivities of metals for heat and for electricity.—D. Hilbert: Mathematical problems, an address before the International Congress of Mathematicians at Paris, 1900.—R. Fricke: Automorphous elementary forms.

July 28.—R. Fricke: Ritter's prime-form on an arbitrary Riemann surface.—A. Voss: On the principles of Hamilton and of Maupertuis.—W. Nernst and H. Reynolds: On the conductivity of solid mixtures at high temperatures.

October 27.—W. Voigt: On the inductivity of ferromagnetic crystals, with special reference to Weiss's observations on magnetite.—M. Dehn: On equivalent polyhedra (capable of dissection into congruent portions).

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 7.

ROYAL SOCIETY, at 4.30.—The Boiling Point of Liquid Hydrogen, determined by Hydrogen and Helium Gas Thermometers: Prof. Dewar, F.R.S.—On the Brightness of the Corona of January 22, 1898. Preliminary Note: Prof. H. H. Turner, F.R.S.—Preliminary Determination of the Wave-Lengths of the Hydrogen Lines derived from Photographs taken at Ovar at the Eclipse of the Sun, 1900, May 28: F. W. Dyson.—Investigations on the Abnormal Outgrowths or Intumescences on *Hibiscus vitifolius*, Linn.: a Study in Experimental Plant Pathology: Miss E. Dale.—On the Proteid Reaction of Adamkiewicz, with Contributions to the Chemistry of Glyoxylic Acid: F. G. Hopkins and S. W. Cole.—The Integration of the Equations of Propagation of Electric Waves: Prof. Love, F.R.S.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—The Action of Hydrogen Bromide on Carbohydrates: H. J. H. Fenton and Mildred Gostling.—Note on a Method of comparing the Affinity-Values of Acids: H. J. H. Fenton and H. O. Jones.—Organic Derivatives of Phosphoryl Chloride, and the Space Configuration of the Valencies of Phosphorus: R. M. Caven.—(1) Synthetical Work with Sodamide Derivatives: (2) Note on Two Molecular Compounds of Acetamide; (3) Diacetamide, a New Method of Preparation: Dr. A. W. Titherley.

RÖNTGEN SOCIETY, at 8.—Experiences of X-Ray Work during the Siege of Ladysmith; Lieut. F. Bruce.

FRIDAY, FEBRUARY 8.

ROYAL INSTITUTION, at 9.—History and Progress of Aërial Locomotion: Prof. G. H. Bryan, F.R.S.

PHYSICAL SOCIETY, at 5.—Annual General Meeting.—Address by the President.—Followed by a paper on Mica Echelon Grating: Prof. R. W. Wood.

ROYAL ASTRONOMICAL SOCIETY, at 3.—Annual General Meeting.

GEOLOGISTS' ASSOCIATION, at 8.—Annual General Meeting.—Twelve Years of London Geology: The President, W. Whitaker, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Cycle Resistance: H. E. Wimperis.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Power-Gas and Large Gas-Engines for Central Stations: H. A. Humphrey.

ANATOMICAL SOCIETY, at 4.30.—The Origin of the Vertebrate Ear and Eighth Pair of Cranial Nerves: W. H. Gaskell, F.R.S.—A Critical Review of Recent Literature on Fossil Anthropoids: W. L. H. Duckworth.

MALACOLOGICAL SOCIETY, at 8.—Annual General Meeting.

MONDAY, FEBRUARY 11.

ROYAL INSTITUTION, at 3.—Origin of Vertebrate Animals: Dr. A. Willey.

SOCIETY OF ARTS, at 8.—The Bearings of Geometry on the Chemistry of Fermentation: W. J. Pope.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—On Her Majesty's Connection with the Society and Interest in Geography, and on Polar Exploration during the Queen's Reign: The President.—Progress of Exploration and the Spread and Consolidation of the Empire in America, Australasia, and Africa: Right Hon. Sir George Taubman Goldie, K.C.M.G.—Advances in Asia, and Imperial Consolidation in India: Colonel Sir Thomas H. Holdich, K.C.I.E.

TUESDAY, FEBRUARY 12.

ROYAL INSTITUTION, at 3.—Practical Mechanics: Prof. J. A. Ewing, F.R.S.

SOCIETY OF ARTS, at 8.—Recent Advances in Pottery Decoration: William Burton.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Paper to be further discussed*: The Present Condition and Prospects of the Panama Canal Works: J. T. Ford.——*Paper to be read, time permitting*: The Nilgiri Mountain-Railway: W. J. Weightman.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Annual General Meeting.

WEDNESDAY, FEBRUARY 13.

SOCIETY OF ARTS, at 8.—Arsenic in Beer and Food: William Thomson.

THURSDAY, FEBRUARY 14.

ROYAL SOCIETY, at 4.30.

MATHEMATICAL SOCIETY, at 5.30.—The Distribution of Velocity and the Equations of the Stream Lines due to the Motion of an Ellipsoid in Fluid Frictionless and Viscous: T. Stuart.—On Factorisable Twin Binomials: Lieut.-Colonel Cunningham, R.E.—Concerning the Abelian and Related Linear Groups: Prof. L. E. Dickson.—A Geometrical Theory of Differential Equations of the First and Second Orders: R. W. Hudson.—Brocardal Properties of some Associated Triangles: R. Tucker.

SOCIETY OF ARTS (Indian Section), at 4.30.—The Greek Retreat from India: Colonel Sir Thomas H. Holdich, K.C.I.E.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Capacity in Alternate Current Working: W. M. Mordey. (Adjourned Discussion.)

FRIDAY, FEBRUARY 15.

ROYAL INSTITUTION, at 9.—Electric Waves: Right Rev. Monsignor Gerald Molloy.

GEOLOGICAL SOCIETY, at 3.—Annual General Meeting.

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